

SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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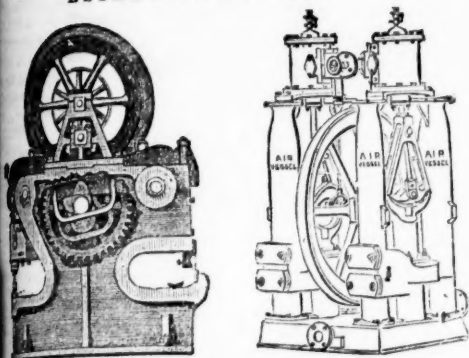
No. 2199.—VOL. XLVII.

LONDON, SATURDAY, OCTOBER 13, 1877.

PRICE (WITH THE JOURNAL) SIXPENCE.
PER ANNUM, BY POST, £1 4s.

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SPECIALITIES ARE ALL SIZES OF

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BAR SHEARS.
ESTABLISHED 1852.



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SALFORD, MANCHESTER.

Excellence
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STEAM and other LAND ENGINES and MARINE STEAM ENGINES
of the largest and most approved kinds in use, SUGAR MACHINERY,
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GROUNDHAND MINING MACHINERY FOR SALE.
In Good Condition, at Moderate Prices—viz.,

WINDING ENGINES; WINDING ENGINES; STAMPING ENGINES;
STEAM CAPTAINS; ORE CRUSHERS; BOILERS and PITWORK of
various sizes and descriptions; and all kinds of MATERIALS required for
MINING PURPOSES.

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IRONFOUNDERS, ENGINEERS, &C.,
Haydon Bridge, near NEWCASTLE-ON-TYNE,
Manufacturers of

AND SMELTING, REDUCING, AND REFINING FURNACES,
BLAG HEARTHES, AND SMELTERS' WORK GEAR.
Plans and Estimates furnished for improved Lead or Copper Mining and
Smelting Plant.

ST. LAWRENCE ROPE WORKS,
NEWCASTLE-ON-TYNE. Established 1782.

THOMAS AND WILLIAM SMITH,
Manufacturers of all kinds of Iron; Steel, Copper, and Galvanised Wire Ropes;
Ropes and Manila Ropes, &c.; Round and Flat Shaft Ropes; Crab Ropes; Guide
Ropes; Manila Ropes; and Galvanised Signal Strand; Ship's Standing Rigging
and complete; Patent Hemp and Manila Hawseers, Warps, Corlages, Spun-yarn,
&c.; Manila Yarn for Telegraph Cables, and Flat Hemp Ropes for Driving
Engines; Wire Ropes; Fencing Wire and Stand Lightning Conductors, &c.
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Branches—North Shields, Blackwall, Newcastle, and Tyne Dock.

STANDARD LUBRICATING OILS
COMPANY, LIMITED.

BLACK and PALE OILS for MACHINERY, RAILWAY, and MINING
PURPOSES, from TWO SHILLINGS per gallon, and upwards.

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GLASGOWHILL ENGINE WORKS, GLASGOW.

PATENTERS and SOLE MANUFACTURERS OF
CHAPLINS' PATENT STEAM CRANES, HOISTS,
LOCOMOTIVES, AND OTHER ENGINES AND BOILERS.

LONDON HOUSE:—
MCKENDRICK, BALL, AND CO.,
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PARIS, 1867.
BRONZE MEDAL, 1867.



ORDER OF THE CROWN OF PRUSSIA.



FALMOUTH, 1867.
SILVER MEDAL, 1867.

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the
Geographical Congress, Paris, 1875—M. Favre, Contractor, having
exhibited the McKean Drill alone as the MODEL BORING MACHINE
for the St. Gothard Tunnel.

SILVER MEDAL of the Highland and West of Scotland
Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecu-
tive weeks, ending February 7, was 24'90, 27'60, 24'80, 26'10,
28'30, 27'10, 28'40, 28'70 metres. Total advance of south head-
ing during January was 121'30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tun-
nel, the McKean Rock Drill continued to work until the pres-
sure was reduced to one-half atmosphere (7½ lbs.), showing
almost the entire motive force to be available for the blow
against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these
Machines for the SEVERN TUNNEL; the LONDON AND
NORTH-WESTERN RAILWAY for the FESTINOG TUN-
NEL; and the BRITISH GOVERNMENT for several Public
Works. A considerable number of Mining Companies are now
using them. Shafts and Galleries are driven at from three to
six times the speed of hand labour, according to the size and
number of machines employed, and with important saving in
cost. The ratio of advantage over hand labour is greatest
where the rock is hardest.

These Machines possess many advantages, which give them
a value unapproached by any other system of Boring Machine.

THE MCKEAN ROCK DRILL IS ATTAINING GENERAL
USE THROUGHOUT THE WORLD FOR MINING, TUN-
NELLING, QUARRYING, AND SUB-MARINE BORING.

The MCKEAN ROCK DRILLS are the most powerful—the
most portable—the most durable—the most compact—of the
best mechanical device. They contain the fewest parts—have
no weak parts—act without SHOCK upon any of the operat-
ing parts—work with a lower pressure than any other Rock
Drill—may be worked at a higher pressure than any other
—may be run with safety to FIFTEEN HUNDRED STROKES
PER MINUTE—do not require a mechanic to work them—are
the smallest, shortest, and lightest of all machines—will give
the longest feed without change of tool—work with long or
short stroke at pleasure of operator.

The SAME Machine may be used for sinking, drifting, or
open work. Their working parts are best protected against
grit and accidents. The various methods of mounting them
are the most efficient.

N.B.—Correspondents should state particulars as to
character of work in hand in writing us for information,
on receipt of which a special definite answer, with
reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL,
IRON, AND FLEXIBLE TUBING.

The McKean Drill may be seen in operation daily in London.

McKEAN AND CO.

ENGINEERS.

OFFICES,

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MANUFACTURED FOR McKEAN AND CO. BY
MESSRS. P. AND W. MACLELLAN, "CLUTHA IRONWORKS,"
GLASGOW.

The Warsop Rock Drill

(Involving an entirely new principle in Mechanical Boring)

Requires only 20 lbs. steam or air-pressure.

Has only two moving parts—thus ensuring freedom from de-
rangement, and is absolutely self-feeding.

Is excessively light, and can be carried by one man, who can
with the No. 1 size (weighing only 35 lbs.) drill 4½ holes
¾ in. diameter and 1½ in. deep per minute, in the hardest Aber-
deen granite for splitting purposes.

WARSOP AND HILL,
HYDRAULIC AND GENERAL ENGINEERS.
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STEAM and HYDRAULIC WINDING and PUMPING ENGINES
of all kinds.

DUNN'S ROCK DRILL,

AND
AIR COMPRESSORS,

FOR DRIVING BED ROCK
TUNNELS, SINKING
SHAFTS, AND PERFORMING
OPEN FIELD OPERATIONS,

IS THE
CHEAPEST, SIMPLEST,
STRONGEST, & MOST EFFECTIVE
DRILL IN THE WORLD.

Dunn's Patent Rock Drill Company

(LIMITED).

OFFICE,—193, GOSWELL ROAD
LONDON, E.C.

PATENT SELF-ACTING MINERAL DRESSING MACHINE COMPANY

(LIMITED).

T. CURRIE GREGORY, C.E., F.G.S.

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LONDON: 52, QUEEN VICTORIA STREET, E.C.

IMPORTANT NOTICE TO MINE PROPRIETORS.

MR. GEORGE GREEN, ENGINEER, ABERYSTWITHE,
SUPPLIES MACHINES under the above Company's Patents for
DRESSING all METALLIC ORES. Dressing-floors having these Machines pos-
sess the following advantages:—

- 1.—THEY ARE CHEAPER THAN ANY OTHER KIND IN FIRST OUTLAY.
- 2.—ONLY ABOUT ONE-FOURTH OF THE SPACE USUALLY OCCUPIED
BY DRESSING-FLOORS IS REQUIRED.
- 3.—FROM 60 TO 70 PER CENT. OF THE LABOUR IN DRESSING, AND
FROM 5 TO 10 PER CENT. OF ORE OTHERWISE LOST, IS SAVED.
- 4.—THEY ARE THE ONLY MACHINES THAT MAKE THE ORE CLEAN
FOR MARKET AT ONE OPERATION.

They have been supplied to some of the principal mines in the United Kingdom
and abroad—viz.,

The Greenside Mines, Patterdale, Cumberland; London Lead Company's Mines
Darlington, Colberry, Nanthead, and Bollyhope; the Stonecroft and Greyside
Mines, Hexham, Northumberland; Wanlockhead Mines, Abington, Scotland (the
Duke of Buccleuch's); Bewick Partners, Haydon Bridge; the Old Durren, Eggar-
mwyn, and Ystumtuen Mines, in Cardiganshire; Mr. Beaumont's W.B. Mines,
Darlington; also Mr. Sewell, for Argentiferous Copper Mines, Peru; the Brats-
berg Copper Mines, Norway, and Mines in Italy, Germany, United States of
America, and Australia, from all of whom certificates of the complete efficiency of
the system can be had.

WASTE HEAPS, consisting of refuse chatts and skimpings of a
former washing, containing a mixture of lead, blende, and sulphur,
DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-
in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly
profits on our Sandhead waste heaps amounted last year to £2600, besides the ma-
chinery being occupied for some months in dressing ore stuff from the mines. Of
course, if it had been wholly engaged in dressing wastes our returns would have
been greater; but it is giving us every satisfaction, and bringing the waste heaps
into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines,
Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much
pleasure in stating that a full and superior set of your Ore Dressing Machinery has
been at work at these mines for fully a month, and each day as the moving parts
become smoother, and those in charge understand the working of the machinery
better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply,
and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines,
says—"Your machinery saves fully one-half on old wages, and vastly more on the
wages we have now to pay. Over and above the saving in cost is the saving in ore,
which is a much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Penrith, say—"The
separation which they make is complete."

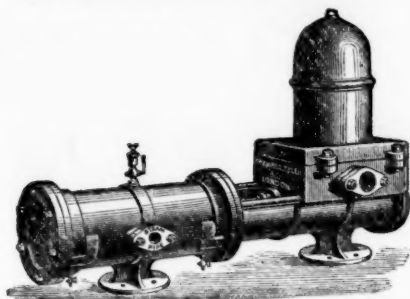
Mr. MONTAGUE BRALE says—"It will separate ore, however close
the mechanical mixture, in such a way as no other machines can do."

Mr. C. DODSWORTH says—"It is the very best for the purpose
and will do for any kind of metallic ores—the very thing so long needed for dress-
ing floors."

Drawings, specifications, and estimates will be forwarded on application to—
GEORGE GREEN, M.E., ABERYSTWITHE SOUTH WALES.

HAYWARD TYLER & CO.

"UNIVERSAL" STEAM PUMP.



1872—SILVER MEDAL,
ROYAL CORNWALL POLYTECHNIC,
1873—MEDAL FOR PROGRESS,
VIENNA EXHIBITION.
1874—GOLD MEDAL,
AGRICOLE DE LILLE.
1873—SILVER MEDAL,
MANCHESTER.
1875—
LEEDS.

1869—The Standard—

"The action is perfectly quiet."

1873—The Engineer—

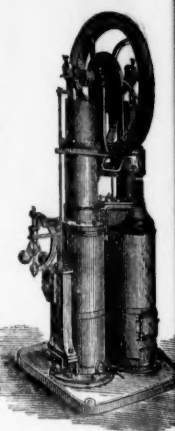
"It is a fact that, although there is a great variety of Direct-acting Steam Pumps exhibited, none that we have noticed worked so quietly as those of Messrs. Hayward Tyler and Co."

1873—Engineering—

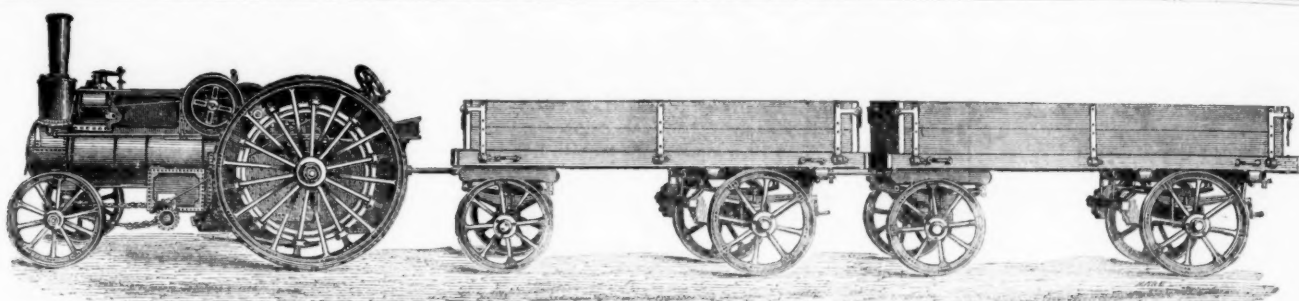
"The 'Universal' (H. Tyler and Co.) Pump can certainly claim to be the simplest machine of its kind in the Exhibition."

1874—Griffiths' Iron Trade Exchange—

"Nothing in steam power so cheap and effectual as H. Tyler and Co.'s 'Universal' Steam Pump."



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STEAM PLOUGH WORKS, LEEDS, AND 71, CORNHILL, LONDON, E.C.,

MAKERS OF ALL KINDS OF

TRACTION ENGINES, ROAD LOCOMOTIVES, TRACTION WAGONS,

AND

STEAM PLOUGHING MACHINERY OF EVERY DESCRIPTION.

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"INGERSOLL ROCK DRILL,"
LE GROS, MAYNE, LEAVER, & CO.,
60, Queen Victoria Street, London, E.C.
5, PARK PLACE, NEW YORK, U.S.A.



We claim 40 per cent. greater effective drilling power, and offer to compete with any machine of its class.

The following extracts from the reports of Judges in awarding Medals:—

"2. Its simple construction ensures durability. &c.

"4.—The steam or air cushions at each end of cylinder effectually protect from injury
"5. Its having an automatic feed, giving it a steady motion, &c
"6. Its greater steadiness and absence of jar and vibration experienced in other drills, which is very destructive to their working parts, &c.

"7. Its greater power is some FORTY PER CENT. in favour of the Ingersoll."

Medals awarded for several years in succession "For the reason that we adjudge it so important in its use and complete in its construction as to supplant every article previously used for accomplishing the same purpose."

Estimates given for Air Compressors and all kinds of Mining Machinery. Send for Illustrated Catalogues, Price Lists, Testimonials, &c., as above.

JOHN AND EDWIN WRIGHT,

PATENTERS.

(ESTABLISHED 1770.)

MANUFACTURERS OF EVERY DESCRIPTION OF IMPROVED

PATENT FLAT AND ROUND WIRE ROPE from the very best quality of charcoal iron and steel wire.

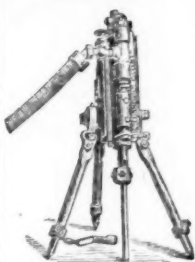
PATENT FLAT AND ROUND HEMP ROPES, SHIPS' RIGGING, SIGNAL AND FENCING STRAND, LIGHTNING CONDUCTORS, STEAM PLOUGH ROPES (made from Webster and Horsfall's patent steel wire), HEMP, LAX, ENGINE YARN, COTTON WASTE, TARPAILING, OIL SHEETS, BRATTICE CLOTHS, &c.

UNIVERSITY WORKS, MILLWALL, POPLAR, LONDON.
UNIVERSITY WORKS, GARRISON STREET, BIRMINGHAM.
CITY OFFICE, No. 5, LEADENHALL STREET, LONDON, E.

THE "CHAMPION" ROCK BORER

STANDS UNRIVALLED

For Tunnels, Mines, Quarries, Harbour Works, Cutting Blocks of Granite, &c.



The working parts are made of the toughest steel and phosphor-bronze—steel castings are also used—as to combine strength with light weight.

AIR-COMPRESSING MACHINERY

Of the simplest and best construction.

Combined Water-pressure Engines and Air-compressors, Giving most excellent results.

ULLATHORNE AND CO., Mechanical and Consulting Engineers, 13, QUEEN VICTORIA STREET, LONDON, E.C.

Archer's New Patent Stone Breakers.

Sole Makers: DUNSTON ENGINE WORKS CO.,
GATESHEAD-UPON-TYNE, ENGLAND.

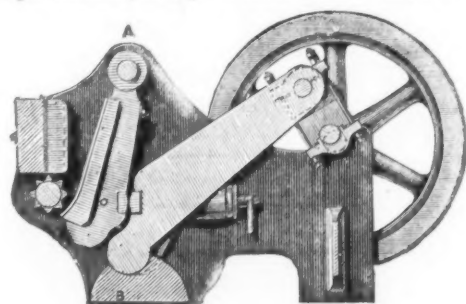
STONE BREAKER,

For Road Metal, &c.

Machines with combined Vertical Jaw and CUBING ROLLER.

Guaranteed to break more cubical and to make less small than any other Machine.

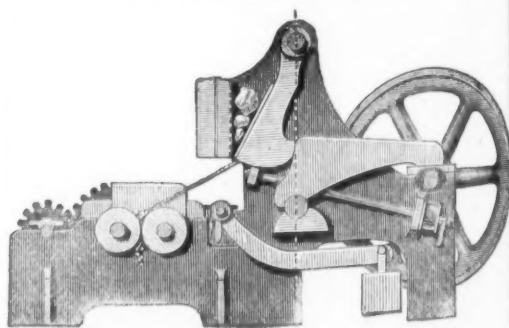
Simple Machines, with plain Vertical Jaws, without Roller.



PULVERISER,

For Crushing and Pulverising Rocks, Ores, Emery, Stone, &c., &c.

Apply for prices and particulars to the Manufacturers, as above.



ARCHER'S PATENT BONE MILL—Sole Manufacturers.

MANUFACTURERS OF MARINE AND STATIONARY ENGINES; AND COLLIERY MACHINERY, CAGES, TUBS, &c., and every description of MACHINERY USED IN CHEMICAL WORKS.

Original Correspondence.

THE COAL FIELDS OF SCOTLAND—No. II.

General description of these coal fields was given in last week's issue, and also of the Gartsherrie coal-cutter, I now proceed to give information and details regarding each coal field separately, commencing with—

THE LANARKSHIRE COAL FIELD.—This includes a large part of the shires of Renfrew, Dumfries, and Glasgow, and a small part of the shires of Renfrew, Dumfries, and Glasgow. Amongst the carboniferous strata of this district are volcanics, occurring either as dykes or in horizontal layers, which are supposed to have been poured out at three periods—the first being in the Old Carboniferous period, the second in the Middle Carboniferous, and the third in the Middle Tertiary period; the age to which the whinstone dykes are referable, being the age to which the whinstone dykes are referable. The Airdrie blackband was discovered within this coal field. The Airdrie blackband was discovered within this coal field. The Airdrie blackband was discovered within this coal field.

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and deteriorated the coal seams. Igneous rocks are found also between the coal measures and the New Red Sandstone rocks, which overlie the coal field in its central part. The production of coal in Ayrshire in 1876 was 3,649,991 tons, from 112 collieries, equal to an average of 114 tons daily on 286 working days in a year.

THE CLACKMANNAN COAL FIELD may be considered as a portion of that of Lanarkshire, being separated from it by the Frith of Forth. According to Mr. Geddes there are eight seams of coal found, varying from 2 ft. 6 in. to 5 ft., and one seam of 9 ft. in thickness, having an aggregate thickness of 33½ ft. There are also some beds of ironstone. The coal field is divided into three parts by two faults, one downthrow to south 410 yards, the other downthrow to south of 233 yards.

THE FIFESHIRE COAL FIELD is divided from that of Clackmannan by the upheaval of trap and carboniferous rocks. The Fifeshire field ranges from Duffrynline to near St. Andrew's on the north, forming a narrow irregular tract between this line and the Frith of Forth. The coal seams are much broken up by faults and igneous matter. Between Kirkcaldy and Pittenweem the coal strata run under the sea, and a submarine coal is to some extent worked. It is probable some of the coal seams may extend under the Frith of Forth to the Lethian coal field on the opposite shore. In Fifeshire the upper and lower series seem to approach near together; no less than 28 seams of coal are found ranging from 1 ft. 6 in. to 7 ft. in thickness, and one—the Dysart Main seam—is 21 ft. in thickness, making a total of 120 ft. of coal. These seams furnish coal suitable for iron smelting, gas making, smiths', and steam purposes, as well as some anthracite.

THE LOTHIAN COAL FIELD is bounded on the west by the Pentlands, an upheaval of igneous and carboniferous rocks. The coal field is divided into two troughs, the one in Edinburghshire has its greatest depression nearly north and south, and runs through Dalkeith; the other or eastern depression, is in Haddington. The seams of coal extend to the Frith of Forth, and, as before observed, probably unite with the Fifeshire coal field. The Lethian coal field, in the western trough, is divided into three series—the true coal measures, 1220 feet, containing 11 seams, varying from 2 feet to 4 ft. 6 in., and an aggregate thickness of 38½ ft. Millstone grit, 340 feet; carboniferous series 1590 feet, containing 17 coal seams, ranging from 2 ft. 1 in. to 8 ft. in thickness, and an aggregate thickness of 57½ ft. of coal. There are several seams of less thickness than 2 ft., and nine bands of ironstone, most of which are thin. In the eastern, or Haddington trough, the coal strata belong solely to the lower or carboniferous series, and can be identified in part with the carboniferous coal in the western trough. Nine coal seams are found in the Haddington side, ranging from 1 ft. 6 in. to 7 ft., with a total thickness of 31 ft. of coal. Below the coal strata the lower limestone in three beds occurs divided by sandstones and shale, this forms the boundary of the Haddington trough on the east and south, and also on the west separates it from the western trough. The calciferous sandstones and beds of igneous rocks occur under the lower limestone.

ROCK-BORING MACHINERY—No. IX.

Early in the year 1866 Jordan and Durlington commenced a series of experiments with their rock-boring machinery, and on Dec. 26, 1866, specified various mechanical devices for reciprocating and turning the piston and boring tool. The rotation of the borer was effected by a twist-bar and a ratchet-wheel, now used in several boring machines. In a second specification, dated Nov. 29, 1867, among other methods described and illustrated for improving rock-boring machines, two ratchet-wheels are shown, placed around the piston-rod in front of the boring cylinder. In the piston-rod is a straight and spiral slot. The two ratchet-wheels engage in these slots, and by means of pawls ensure the permanent rotation of the tool. This arrangement has since been patented by other individuals.

Some of the machines were worked by means of an "hydraulic bar," and under high pressures of water, but the movement of the water in each case failed to impart the requisite velocity to the piston, and hence the cutting action of the tool was unsatisfactory.

Döring, an able inventor of rock-boring machinery, not only devised a variety of ingenious and valuable contrivances for simplifying and rendering rock-boring apparatus more effective, but he devoted himself to the practical part of the subject with an intelligence and perseverance deserving substantial reward. Without lengthy description and costly illustrations it would be impossible to present an adequate idea of Döring's labours; but for this purpose his numerous specifications may be consulted:—Dec. 13, 1865, No. 3218; Nov. 9, 1866, No. 2922; Jan. 7, 1867, No. 43; June 10, 1867, No. 1704; June 19, 1868, No. 1939; Sept. 26, 1868, No. 2965; Nov. 10, 1869, No. 3240.

From July 1 to Oct. 31, 1863, the 184 fm. level was driven at Tincroft by a Döring machine. The ground was "hard, very jointy, and vuggy throughout." The hand contract price, 20M. t. 22L. per fathom; the rate of speed with six men, 8 feet per month. The cost with the assistance of a boring machine, 17L. 18s. 7d. per fm.—the rate of advance more than double that of hand-labour; although the driving machinery was of insufficient power, the general arrangements defective, and many days were lost in repairing the plant. Now that nine years have passed away, and the importance of employing rock-boring machinery in our Cornish mines is at last recognised, it may be well to reproduce the cost of the 12 fms. of ground referred to:—

	£	s.	d.	or	£	s.	d.
Candles	2	18	6		20	4	10½
Oil and waste	4	12	0		0	7	8
Guncotton, fuse, &c.	17	16	2		1	9	8
Coal	23	7	4		1	18	11
Repair of air-pump	6	15	0		0	11	3
Repair of boring machinery	1	5	0		0	2	1
Wear and tear of plant	20	13	4		1	14	5½
Wages—							
Unengaged, 6 men and 2 boys..	89	5	6		7	8	9½
Surface, smith and 2 engine-men..	48	10	11		4	0	11

Total ... £215 0 9, £17 18 7

Döring was of opinion that one machine well handled would drive ground three times as fast as it could be accomplished by hand-labour alone, that winzes for ventilating purposes could mostly be dispensed with, and that exploratory levels might if desirable be driven further apart, conditions abundantly verified by the experience of others who have given practical attention to the subject.

A boring machine, invented by R. G. Ford, of Sandhurst, Victoria, about 1868, was patented in England on Aug. 10, 1869. The following description of this machine is taken from Smyth's work on the "Gold Fields and Mineral Districts of Victoria."—The motion of the tool is reciprocating, and the motive power, compressed air or steam, applied at a pressure of about 60 lbs. per square inch. This pressure is constantly exerted on an annular area in front of the piston, and intermittently on the whole area of the back of the piston. The ports for the alternate admission of the pressure fluid and for the exhaust are opened and closed by a valve worked by a small piston. The air-ports and the movement of the valve are so arranged that the piston cannot strike the front and back of the cylinder. The rotation of the boring-tool is caused by the piston-rod working a ratchet and pawl around a cylinder attached to the front of the working cylinder, and as the piston reciprocates it carries itself around the cylinder, and makes a complete revolution every 21 blows, by which means the tool cuts a round hole. The tool is self-advancing and self-adjusting, effected by the working cylinder being provided with an external cylinder in which it can slide. The motive pressure is constantly tending to propel the working cylinder forward, but is retained by a screw, which is prevented from turning by a pawl, which the piston strikes when it makes a full stroke—thus releasing the screw, and permitting the working cylinder to advance forwards as the hole increases in depth. The weight of blow struck by the piston under a pressure of 60 lbs. per square inch is 500 lbs.; number of blows per minute, 500 to 600.

Osterkamp's boring machine was patented in England on May 20, 1870. The machine consists essentially of a cylinder and piston and piston-valve; the rod of the piston-valve carries a pawl on its upper

end, which acts on a ratchet-wheel, which wheel rotates a spiral-pawl passing through the end of the cylinder into the piston-rod, and produces the turning movement required. The weight of an Osterkamp machine, having a piston 3 in. diameter, piston-rod 2½ in. diameter, is 50 lbs.; weight of tripod stand, 56 lbs. The machine bored a hole in coal sandstone 1½ in. diameter, 8-10ths of an inch deep, in one minute; and in the same time a second hole ½ in. diameter, 1½ to 1½ in. The speed of the piston under a pressure of 31 lbs. of air per square inch is about 200 strokes per minute. For particulars and illustration of machine, see specification No. 1466, A.D. 1870. The inventor designed the machine to be held to its work by a single miner. For some time it was used at a mine near Eschweiler, and at one or two places in Westphalia; but the reactive impact of the machine to the shoulder of the workman and difficulty of keeping the tool in a determinate line were disadvantages which could only be obviated by resorting to a mechanical mode of fixing it.

The Dabois Francis machine is not only largely employed in Belgium, but is one of the varieties used in forming the St. Gothard Tunnel. Francis, among other engineers, was engaged in driving the Mont Cenis Tunnel, and had during the progress of that work ample opportunities of acquainting himself with the constructive arrangement and details of the Summiller drill, as well as with the system employed for effecting the removal of the rock. The machine, which partly bears his name, although much shorter and of less dimensions than the one devised by Summiller, is mounted on a carriage in a somewhat similar manner. The bar to which the machine is attached is set so as to take the reaction of the machine on the line of its longitudinal axis. The machine itself is formed of two parallel bars on which the main cylinder is placed, a main and valve cylinder, a trigger like tappet, and two small pistons for effecting by means of a bar and pawls the rotation of the boring-tool. The valve is shifted by an annular tappet on the piston-rod lifting a trigger. This trigger operates on a conical valve. The opening and closing of this valve in connection with the arrangement of the piston-valve effects the movement of the latter. The main cylinder carrying the boring-tool is advanced or withdrawn by turning a hand-wheel, which wheel operates on a round thread-screw. The total length of a machine employed at Marihuys is 64 ft.; width, 14 in.; depth, 12 in.; run on forwarding screw, 22 in.; diameter of cylinder, 2½ in.; of piston-rod, 2 in.; length of stroke, 5 to 6 in.; weight of machine, 480 lbs.; pressure of air required, 4 to 5 atmospheres. Francis's English specification is dated May 7, 1872, No. 1398.

It is not necessary to describe the machines now before the public. Burleigh patented his invention Nov. 22, 1866; the mounting, general arrangement, valvular and rotating device were points marking a decided advance upon machines previously constructed for mining purposes. McKean's specifications bear date April 14 and Nov. 20, 1870. The machines made by this inventor have been extensively employed, and notably in the St. Gothard Tunnel. The Power Jumper, Kainston, and Barrow drills (each of the same class) are distinguished by their valves; the Ingersoll by its tappet-valve and feeding device; the machines of the Diamond Rock Boring and Tunneling Company by the automation of their various parts.

Machines for mechanically removing the rock without the use of explosives devised by Beaumont, Loscock, Penrice, Cooke, Brant, and others need not be adverted to, since they are inapplicable to ordinary mining operations conducted in hard crystalline rocks. Neither is it important to notice Abeggs, Trautz, or the Villedup perforators, inasmuch as their use is confined to coal, chalky, and soft argillaceous stone. Jordan's percussion hand-boring machine was only introduced to the attention of the public some few months ago. If suitable and economical for quarrying and underhand stoping, or for shafts requiring but a few holes to remove the rock, it will possess considerable value.

The first inventor of a rock-boring machine seems to have been Trevithick. At the time when his attention was directed to the subject Cornwall was not only the chief seat of mining industry; but, through the startling improvements effected in the steam-engine by Watt, Murdoch, Trevithick, Woolf, and others, an impetus was given to mechanical inventions which extended far beyond the confines of the county, and men were stimulated at home and abroad to substitute as far as possible mechanical appliances for manual labour. Some forty years, however, passed away before the idea of boring shot-holes by means of machinery was rendered practicable. The exigencies of the Mont Cenis Tunnel induced Bartlett to devise a steam rock-boring machine. Later Summiller invented the machine which bore his name, and showed how it could be worked by compressed air. Following Summiller's success in the Mont Cenis Tunnel, Italian, German, French, Swedish, American, Australian, and English engineers addressed themselves to the subject of inventing, contriving, and improving rock-boring appliances. Machines 10 ft. long, beset with complicated gear, are now replaced by machines 3 ft. long, pre-empting little more than the cylinder, valve and a forwarding device. All real and permanent improvements have tended in the direction of increased strength and simplicity of parts. In more particularly tracing the development of inventors' ideas for expediting tunneling and mining operations it will appear that they group themselves into—1, forming the shot-hole by a revolving drill, and blasting the hole itself; 2, removing the entire area of the heading without the use of an explosive by the use of a huge percussive or cutting machine; 3, boring shot-holes by means of a small percussive engine. The failure of the first method, employing an ordinary steel tool in hard siliceous rock was soon rendered apparent; the tool instead of abrading the stone was almost immediately destroyed. The second method—substituting mechanical for mechanical and chemical force, also proved objectionable when applied to hard crystalline rocks. Apart from the machine, blocking as it were the forebreast, the mechanical power required for performing the work was not only excessive, but the progress slow, and the greatest difficulty experienced in keeping the tools in condition for doing their work. The third method—the use of percussive borers in combination with chemical force, is the one which has been, and is likely to be, attended with permanent success. In perforating a heading with the requisite number of shot-holes only a minimum expenditure of mechanical power is required; the chief work, that of removing the rock, being effected by the superior agency of chemical force instantly developed by the detonation of an explosive compound. In a percussive borer the movements required to form a hole are of a threefold character—1, a reciprocatory movement of the piston and tool to disintegrate the rock; 2, turning the piston and tool during the reciprocatory movement; 3, advancing the tool as the hole is deepened.

In one or two machines before the public these movements are automatically performed, and such automatic movements are desirable when four or six machines are worked together; but the forwarding or advance movement will be liable to fail in its object unless the rock is of uniform structure and hardness. In other boring-machines the automatic movements are confined to the reciprocation and rotation of the piston, while in some the piston and tool are rotated by hand. When a single boring machine is in use a merely reciprocatory movement may suffice, but the rejection of a well-devised and simple rotative piston movement is by no means desirable. In many cases the object of an inventor has been to make his machine light, and of small dimensions. As the miner has greatly encouraged the idea of employing a light machine it may be observed that this condition in itself has rendered light machines all but useless for practical work, and enabled the miner to cite instances of failure where success could hardly have been expected.

In continuing our subject it will appear that a quick rate of advances in tunneling operations will depend upon admitting the value of several factors—1, the machines must perform their work with certainty; 2, to perforate a face of rock within a minimum period of time a maximum number of machines must be employed; 3, the number of machines should bear some general relation to the area of the face; 4, stands are requisite for carrying the machines, not only as a rigid support to keep the "bit" in line of the hole, but to admit of angling and shifting the machines quickly to any desired position; to leave, also, the attendant workmen somewhat free in their movements, and not under the necessity of seeking suitable places for the support of stretcher-bars—in addition the use of stands

will admit of giving such dimensions to the machines that holes 30 in. deep can be made without changing the tool, while holes 6 to 10 ft. deep can be drilled if necessary; 5, charging and blasting the shot-holes must be systematically performed and the holes electrically fired, provided this part of the tackle can be rendered permanently reliable; 6, the debris resulting from the blasting operation should be quickly removed, and the boring operation recommenced almost immediately after the final blast; 7, the men employed must be skilled and well trained in their work, and in some way ought to be interested in the pecuniary result.

JOHN DARLINGTON.

THE DISCOVERY OF GOLD IN NEW SOUTH WALES.

HARGREAVES AGAIN.

SIR.—It may seem invidious to quote a living man's name for one's purpose in a newspaper, but seeing that a serious amount of public money has been from time to time awarded to the alleged discoverer of gold in these colonies that name becomes a species of public property in the matter of certain discoveries—by-the-bye fortuitous, or if any other than fortuitous perhaps more his mates' than his own. There are various ways of accounting for luck. A man may be lucky through a ladylike mother or handsome relative; there is folk's luck of accident, which is, nevertheless, often ascribed to the lucky one's sagacity. There is the luck of praiseworthy endeavour; some have the double chance of luck who can consent to the use of a dirty handle or a clean one to accomplish an object. Luck sometimes results from impudence, overreaching, and greasing the palm, and all this while "bread" is denied to "men of understanding," effort, and ability. By what species of luck is it that one man with a slender pretext beyond mere accident can pass from colony to colony, "cut and come again" with their exchequers, while another, with multiplied and forcible evidence in his favour, has difficulty in gaining access, a hearing, advocacy, or recognition in any shape or form, is puzzling to surmise.

It is a fact, Sir, that the earliest alluvial gold washer by a year, two, or three in these colonies, who left his home and staked his whole on his vocation as mineral surveyor and explorer in these colonies, made his discoveries at his own cost, by his own labour, communicated with the authorities in England and these colonies on the enormously wide spread of gold, seeking not a gratuity or premium out of the public purse, but either a privilege in a portion of the soil or an appointment under the Government as explorer, engaging to show what he knew to exist. It was he who in 1848 addressed an enquiry to Sir Charles Lemon, M.P., among other things, whether the Crown would bar mining for the precious metals in these colonies, on which that gentleman induced a committee of the Imperial Parliament to sit and to reply in favour of the explorer.

It would be tedious to go into matters fully from end to end to show why the first man failed in all his efforts for recognition. There are hundreds of living witnesses to his early labours; he has the autographs of great men in England and these colonies, and presumes to add that no other person claims so early a communication as his own with Sir R. I. Murchison on the gold of these colonies. His discoveries were the result of systematic, painful, protracted, and costly search; he did all a man could do to benefit by his discoveries, but failed. His gold washing outfit was made ready for his use in 1848, after a model now to be seen in Melbourne University, but something transpired with the South Australian Gold Mining Company to suspend operations with them. The apparatus has never been exceeded in point of speed and efficiency, by reason of the process involving only once shovelling of the soil acted on.

JOHN PHILLIPS, Mineral Surveyor.

Parker, N.S. Wales, Oct. 10.

NEW QUEBRADA COMPANY.

SIR.—Having invested in the shares of this company some time since at a somewhat high price, and finding that the enterprise appears to be "dragging its slow length along" without any satisfactory evidence of practical knowledge of the requirements of the company on the part of the board, I venture to urge my co-shareholders to combine with a view to rescue the concern from the present unpromising condition to which it has fallen. I am convinced that unless some such measure is speedily adopted we shall find ourselves in a far more desperate plight than that indicated by the letter from Mr. Bird some short time since, which explained the cause of the low quality of the ore sent from our mines. In that letter we are told that the ore was being shipped without being even submitted to the crudest form of dressing, and this astonishing statement is unfortunately only too fully corroborated by the recent ore sale at Swansea, where we find that some parcels of the Quebrada ore only averaged 8 per cent. of copper. I need scarcely remark that ore of so low a grade will not nearly pay costs of mining and transport, but how can matters improve whilst not the simplest assay in the way of testing the value of the ores seems to be made previous to their arrival in England, or surely such rubbish would not be sent, as by adopting the ordinary recognised system of dressing the ore could be made to yield 20 per cent.

Another source of dissatisfaction is the fact that we cannot get any information from our agents through the board. When I with many others supported the election of Mr. C. Paul Hemming it was through his manifold assurances (as per his pamphlets) that we did so, but notwithstanding the fact that he is now the vice-Chairman and managing director, for which I am told he receives a larger salary than his colleagues, he fails to fulfil the promises pledged to his supporters, who regarded him then as one of their number, with but one common object in view—the legitimate success of the company. Is this state of things to continue? or are the shareholders to really take matters in their own hands, and elect a board composed of gentlemen capable of conducting the company's business in a practical, straightforward, open, and candid manner towards the shareholders at large? The great value of the property, and the grand results which may, doubtless, be derived from it an early day, warrants, in my opinion, the grave step I have suggested on the part of the shareholders to look more closely into the affairs of the company.—*Evening, Sept. 11.*

INVESTIGATOR.

CHEAP BESSEMER STEEL.

SIR.—The complaints of the declining quality of British steel and steel manufactures have of late been so numerous that it is absolutely necessary that something more than has hitherto been done to ensure uniformity of quality should be resorted to, for the complaint is not so much that high quality is not produced, but that from want of uniformity there is an absence of reliability. Now, it appears to me that the invention recently patented by Mr. Robert Hadfield, of Southampton Buildings, is exactly calculated to meet the difficulty, as he claims that not only is a very superior quality of metal produced, but that there is likewise a considerable economy both in time and in the quantity of materials used. Where a blast-furnace is employed in connection with the manufacture of steel, he charges such furnace with suitable hematite ore, or any other suitable ore which is free from phosphorus and sulphur, and smelts the same therein until it is reduced to a molten state. He then runs the molten metal direct from the blast-furnace into any suitable converter, preferably a Bessemer converter, instead of running the metal into "pig," as is now ordinarily practised, thus avoiding any necessity to re-melt the pigs, thereby considerably economising both labour and fuel. He then blows and treats such molten metal whilst in the converter in the ordinary manner, whereby it is greatly purified. He then runs it from the converter into any suitable furnace, preferably a Siemens-Martin furnace, which he previously heats to a sufficient degree so as to avoid any injurious cooling of the molten metal whilst under treatment; and he then retains the metal in such last-mentioned furnace for a suitable period, varying according to the quality or temper of the steel required to be produced—that is to say, whether it be what is technically known as hard, soft, or medium steel. In this way he possesses entire control over the metal under treatment, and is enabled to thoroughly eliminate any superfluous carbon or other impurities which might tend to prejudice its quality, and thus a very superior class of steel is obtained as the result of his improved process. In those cases where a blast-furnace is dispensed with he

melts the pig-iron in any suitable cupola or air furnace, and when ready he runs it into a suitable converter, such as a Bessemer converter, and treats it as already described.

I think it will be generally acknowledged that the combined process has many advantages from the facility with which the metal under treatment is held in entire control, thus not only enabling him to produce a far higher quality of steel than is obtained by any of the present known methods, but also effecting thereby an immense economy in time, varying from six to ten hours, and thus ensuring a consequent saving of the labour and fuel requisite for its manufacture, at the same time that by such improved combined process he is enabled to carbonise the steel according to the quality and temper required to be produced.—*Oct. 10.*

PUDDLER.

CENTRAL SWEDISH IRON COMPANY.

SIR.—I dare say you will remember that in the palmy days of 1873 this concern was ushered forth with military honours, for had we not General this, Colonel that, and Captain t'other, with at least one live lord, but he, poor fellow, was a victim, and, to crown all, had we not Mr. Bagnall, who discoursed learnedly on feudal law and on the advantages of granite for building furnaces? Well, 350,000*l.* was lost, and no one seems to know how. Can you tell us anything about it? I saw something about Baron Grant and Bagnall and Sons. Was our Bagnall one of these Bagnalls, or had the Baron anything to do with the works? Are we to hear nothing more about it? Were the directors duly qualified in the usual way, or did they pay for their shares like other people? Making every allowance for mismanagement, for there was some iron made, I believe, it seems difficult to say where all the money went. A SHAREHOLDER.

THE PRODUCTS OF COAL.

SIR.—Allow me to thank your correspondent, "D. F.," for his interesting communication in last week's Journal. He will, perhaps, kindly oblige your readers by extending the list of products in the phenol and pyridine series, and refer us to some sources of information as to formulae, &c.—*Liverpool, Oct. 10.*

T. A. R.

MINING IN IRELAND.

SIR.—Having read the interesting letters of Capt. Phillips and Capt. Thomas in the Journal of Sept. 22 with the above heading, I felt pleased the subject was taken up, and I trust will not be allowed to drop until the Irish and English capitalists are roused to a sense of the danger they incur in speculating in foreign mines, whilst there are valuable properties in Ireland to be developed which in practical hands would pay a good and safe dividend. The two gentlemen referred to are strangers to me, but they appear from their letters to be practical men, and their acquaintance with the Irish mines, and their own practical experience should be worth the attention of English capitalists. I have travelled the most part of Ireland, and know it to be rich in minerals, but unfortunately the Irish are not a speculative people, and as it is considered below the dignity of gentlemen to be concerned in business, the mineral resources of Ireland are chiefly developed with English capital.

The misfortune of Ireland is—at least, one of her misfortunes—that the middle class is not recognised, and the man who rises from the ranks is looked upon as the offshoot of the lower order, and he, trying to ape the nobleman, instead of encouraging the development of the minerals of his country, would prefer to have his country house and his carriage, and when he finds the English capitalist making a fortune in his country he displays a spirit of jealousy often inexcusable. In England if a shopkeeper makes a few thousand pounds he launches into business, or takes shares in mines or factories, and thus keeps his capital floating. Not so with the Irish shopkeeper; he is afraid to speculate in any business beyond his own, and often, instead of training his son to some useful employment he must have a commission in the army, or a Government situation. To this, of course, there are honourable exceptions, but they are very few indeed. A moment's reflection will convince those who are so noisy about Home Rule and Government assistance that if they look more to what they can do for themselves than what the Government should do, they will have much less cause for complaint. In England we believe God helps those who help themselves, hence England's prosperity and Ireland's adversity.

There are other matters that could be introduced here, but believing that the Journal is not the place for them, I leave it for another medium. Referring again to the letters of Captain Phillips and Captain Thomas, I would strongly urge upon both English and Irish capitalists to direct their attention to the mineral resources of Ireland, where they will find a rich harvest yet undeveloped. I believe two-thirds of the failures of valuable mines are caused through the inexperience of the mining captains. Many of them have a knowledge of working with the pick, but being totally destitute of that theoretical knowledge necessary to the development of the property, when the vein nips up, as miners call it, they abandon it as useless, whereas a man practically and theoretically acquainted with mining would be able to form a proper estimate of the utility of pushing forward the place so nipped, which often opens up a valuable property. I speak now from practical experience, having had a similar case to the one stated, in which my foreman insisted on abandoning a vein that nipped up, as he called it, and which on being pushed forward opened out 6 ft. in about two months. I am acquainted with some very valuable properties yet undeveloped, which by a small outlay would yield a good return.

T. DINEEN.

Queen street, Leeds.

OUR HOME MINES.

SIR.—There are risks associated with mining companies as with every other speculative enterprise, yet all industries and pursuits are alike allied with hazards, or otherwise there would be no interest or profit accruing from promoting and extending manufacture, constructive undertakings in the matter of railways, canals, docks, gas, water, building, shipping, nor, in fact, in trade and commerce. The spirit of opposition pervades and permeates every branch and department of our social and commercial systems, and without that "hope" which springs from the "risks and hazards" of active and persistent speculative adventure England would never have achieved her present and proud supremacy at home, nor possess the colonies that make her powerful and respected throughout the whole world; these, tending with agricultural and mineral wealth, enriching and ennobling not only the Mother Country, but also enriching and amply sustaining the existence and opulence of her hardy sons who have emigrated to distant shores. Thrift, economy, and industry as a rule stimulates activity and regulate the conduct of English emigrants, and probably, save America, or rather the United States, no country surpasses in progress and prosperity our colonies—Australia, New Zealand, the Cape, and Canada, and in their gain of wealth and social advancement agriculture and mining go hand-in-hand, and are to all intents and purposes twin sisters, and equally indispensable to the social and material amelioration of the people. Still, in the face of all the discoveries of gold, silver, lead, copper, tin, diamonds, and gems in our colonies, we must not neglect our mining interests at home; hence we hail with the liveliest satisfaction the upward movement in tin, and the consequent advance in the market value of Cornish tin shares. Dolcoath, Tincroft, Cook's Kitchen, South Crofty, Basset, and Uny have all been advantaged, and it is devoutly to be hoped that the present is only the harbinger of further improvements.

We regret to add that Tankerville shares, 6*l.* paid, positively stand at 15*s.* to 20*s.* discount; Roman Gravel, 7*l.* 10*s.* paid, are offered at par; Leadhills, 6*l.* called up, are offered at 15*s.* discount; Ladywell stand at 50 per cent. discount; West Tankerville, 65 to 70 per cent. discount; while Perkins Beach, consisting of 30,000 *l.* shares, sell at par. Tankerville has declared no dividend for the year, and in the aggregate has paid only 4*l.* 17*s.* a share; Roman Gravel has paid back just the outlay incurred; Leadhills, 12*s.* out of 6*l.*; West Tankerville, Ladywell, and Perkins Beach *nil.* The outlay on these six mines have been 334,000*l.*, dividends 144,000*l.*, and present market value 310,000*l.*, showing a profit of 70,000*l.* to original shareholders in dividends and market value, or rather over

18 per cent. on the capital called up. Great Laxey, now selling at 315,000*l.*, has already declared dividends of 332,250*l.*, and cost shareholders only 60,000*l.*, purchased as a going concern. Agate Miners cost the shareholders 45,000*l.*, is at present selling at 162,000*l.*, and repaid in dividends 605,250*l.*. Isle of Man 238,300*l.* dividends. The Van 332,625*l.*, selling at 465,000*l.*, and purchased a going concern for 63,750*l.*; and the Lisburne, with an outlay of 18*l.* 15*s.* sell at 80*l.*, and has declared dividends of 582,100*l.* 400th share. Of late years undue attention has been directed to lead mines in Shropshire, and to the neglect of most deserving properties in Yorkshire and North and South Wales. The Cornish promises to become a star of the first magnitude, while Grogan, Pennant, Wye Valley, West Wye, Prince Patrick, Gorse, Merilyn, North Hendre, and St. Harmon have already entered dividend list.

Among the most promising progressive companies requiring aid and patience to mature may be enumerated East Chiverton, being the successful and once favourite market mine West Chiverton at one time selling for 250,000*l.* upon a capital of 30,000*l.* only, total dividends up to this date have been 165,000*l.*. Again, we notice Bodidris, Monydd Gorddu, Talybont, Pateley Bridge, Pateley Bridge, East Craven Moor, and Tyn-y-Fron.

The Hultafall, in Sweden, continues to open out a continuous

of ore, and as the dressing machinery is under contract to be

this month, the large accumulations at surface, estimated at

to 1250 tons of dressed ores, lead and blende, must early in

coming year become available for dividends, as the paid-up

is ample to purchase and erect the machinery, and to mature

underground workings.

R. TRENDLEN.

STRIKES, COMMERCE, AND CORNISH MINING.

SIR.—Nothing can be more indefinite, uneasy, and unsteady than the present state and prospects of the labour market. In face of money hardening, and the rate advanced to 4 per cent. with every likelihood of its still increasing to a Bank minimum 5 if not 6 per cent.—with manufacture and enterprise crippled, remuneration reduced to its very lowest ebb—the most harassed masters and capitalists with their ill advised courage and stubborn reckless and ruinous strikes. If the men out at Bolton and in Lancashire were to encourage economy and in themselves and families there would be an end to lock-outs, strikes, for they would soon learn the costs of both or either discern the fact that the burden recoils on themselves. At Chester the markets have got worse and worse—that is to say and still less doing. Cotton has advanced in price and cost of manufacture has increased, but buyers refuse to lend a helping hand. At Bradford the markets continue without relief, and the labour and unremunerative state of trade is severely felt.

We are arrived at a point when the appalling amount of idleness will have to be faced and met. The delivery-lay will soon round, and in the agony of a general settlement debtors will find themselves "cornered" in all directions and in all trades and businesses. Prices will ruinously fall the fancy heights at which the "bulls" have raised them, bargains are by no means confined to the sublime region of Stock Exchange; for, in fact, Lombard-street is equally victim of the treacherous game of time bargains and fallacious accumulation, and to the extent of two or three fold the actual value of mortgages. Bankers and discount houses have elevated finance inflated pitch disproportionate with securities; in fact all commerce is carried on by time bargains, and when the necessity for "portfolios of bills" being met by "gold" then comes the war, and the crash of bankers and financiers follow in the wake of pawnbroking merchants and propped up gigantic traders—"creditors" are the "bulls" who inflame the prices; the "debtors" are the "bears" whose interest lies in the depreciation of gold. "Bulls" will have it now that the great settlement approached on from the long protracted and still depreciated value of manufacture and trade; and this is the gloomy and withering atmosphere in which we live, and which we for some time must breathe—better the crash come speedily and a re-arrangement of engagements made under better auspices, and on more principles.

Unhappily, commerce is at a standstill, the revenue showing a comparative reduction, which, if not alarming, is at least signifying the volume of labour in requisition is steadily diminishing;—clumsy and expensive expedients—are being multiplied in directions, and the winter approaches with rapid strides, but accompanied by any signs of commercial improvement; the prospects of the money market are that by a stern necessity rate will advance—and this much is certain, that trade and commerce will come with money at 5 to 6 per cent.—say naught of 8 per cent. as very possible if not probable to arise with the month to six weeks of the present year. It is time for business to be on the alert, and merchants, manufacturers, and traders should promptly husband their resources.

The advance in the price of tin created at Redruth last week excitement and buoyancy have not been witnessed since 1871 and 1872, when tin ore gradually advanced to 95*s.* and 100*s.* a ton. The London market has been firmer in sympathy the volume of business has not been large; in fact, the Stock Exchange jobbers, as a rule, are not large holders of Cornish shares, for when in the years referred to all Cornwall was with the fallacy of tin ore (70 per cent. of metal) reaching 100*s.* they supplied the cute miners of the South-West of England with Dolcoath at 90*s.* up to 95*s.* a share; South Crofty 130*s.* a share; Cook's Kitchen, 30*s.*; Carn Brea, 160*s.*; East Pool West Basset, 12*s.*; Basset, 100*s.*; Kiddy, 104*s.*; Owles, 200*s.*; lack, 100*s.* In fact, the experts on 'Change were unequalled more than equal to the practicals of Redruth, who thought and as if the discovery of tin in Australia was a myth as visionary as if the prices proved of their favourite mines first years ago.

We may observe that no description of property is so evanescent and liable to sudden and startling fluctuations as mining. We can remember Cook's Kitchen shares to have been 50*s.* and to 2*l.* a share, again up to 40*s.* and down to 1*l.*, up again to 30*s.*, and a fortnight ago down to 5*s.*, from which share was denly sprung to 25*s.*, and close to-day. Dolcoath shares which experience were down to 8*s.* to 10*s.* per 179th share; for years no dividend was paid, yet the same shares advanced to 2250*l.* and 2350*l.* A fortnight ago the price had receded to 2250*l.* and 2350*l.* At one bound the price rose to 720*l.*, and close this day at 960*l.* for the 179th part—the original share having been now 4395 in number, 102 *l.* 1*s.* 10*d.* called up, with a dividend of 111*l.* 16*s.* 3*d.* a share.

On the advance in the standard for tin West Basset from share rose to 10*s.*—despair was supplanted by hope. East from 8*s.* sprung to 11*s.*; South Crofty, from 3*s.* to 9*s.*; Cook from 23*s.* to 30*s.*; Uny, 12*s.* 6*d.* up to 25*s.*; Basset, from 10*s.* to 10*s.* a share, and others in proportion. It is evidently a Cornishmen in the years 1871 and 1872 drew largely on the stores of Pandora's box; it is now devoutly to be wished that faith in the requirements of Russia and China raising and increasing higher quotations for the metal may not turn out to be groundless as their hopes some five to six years since. It is remembered that Russia is a long way from Constantinople, she has as many cooking utensils to repair as she has had "poles" to mend, it should also be borne in mind that the requiring a large consumption of tin for the remainder of the twentieth century is wholly out of the question in that sparsely populated and now all but ruined country. We dare venture that that neither the Mother Country nor her colony of Australia greatly extend their tin trade with China before the war with Russia and Turkey is ended, and we heartily wish success latter, for the pretensions of the Czar are as ridiculous as the feignings of Christianity are absurd and intolerable.

Let Cornwall introduce practically the boring machinery, and merchants' supremacy in supply of machinery and materials.

3, 187

MINING IN CUMBERLAND.

Min- Mining in all its branches has been under a cloud for a considerable period, but I think that we shall soon see a great revival in the price of metals, which will at once re-cituate many mines which are in abeyance. Cornwall having been worked vigorously for many years does not now present the same chances for a rich discovery, although there are, doubtless, many mines which would pay well at an advanced price for tin and copper. Wales appears to be the most promising district for lead mines, and is besides, comparatively speaking, in its infancy regarding mining. One great feature in mining in Wales is that generally the veins can be traced by adits. Coming further north, the district round Keswick, which in past ages very prolific for lead and copper, but at present little is being done. Greenside Mine is still continuing its operations, and the reserves of ore here are something enormous. There are, perhaps, four or five mines being worked in the neighbourhood of Keswick, only one of which I have been able to visit; but if they have the same appearances as that one presented, I have no doubt but they will soon attract attention. The mine alluded to is called the Saddleback Mine, situate near the village of Threlkeld, and includes two well-known veins, called Woodhead and Gategill, which have been wrought extensively, and other veins upon which little has been done. There are three adits in Woodhead vein. The low level has been driven upwards of 150 fms., and numerous bunches of ore passed through, which have been worked out up to above the middle level 20 fms. higher. These bunches are untouched below the low level, except in one place where a trial was made by means of a handpump, and a fine quantity of ore found, but which could not be followed down on account of the water. A lower level than this could be brought up, or a water-wheel erected, to work these bunches. The middle level has been driven about 130 fathoms, and for the last 10 fathoms there is a level of ore ground, which would pay well for crasping machinery. The stuff raised by driving through this can be seen lying in a small amount of level. There is a communication between the low and middle level, which gives good ventilation. The high level has not been driven far up the vein, consequently no ore is to be seen. Gategill vein crosses the gill further up, and three levels have been driven upon it. The lowest level enters upon the one side of burn, and crosses the burn at about 40 fathoms from its mouth. At this point there has evidently been a large body of ore, which I have no doubt has since been gone down good. The vein is over 4 ft. wide, and from the burn this level is driven north about 30 fathoms, mostly upon ground. It should be continued about 35 fathoms further, where there is a good bunch of ore in the sole of the middle level. The middle level is driven upwards of 200 fathoms, and several bunches of ore passed through. One of these, about 100 fathoms from the mouth, was so rich as to cause the shares of the company to advance 100 per cent., but it failed in the roof. The present ore is very wet, and in a strong sparry lode. An intersection with another vein called Blencattia vein is looked for daily, when I have no doubt but that a good mine will be the result. In conclusion, I think that I have seldom seen a mine with such

STR.—I was very much surprised to see in the Journal a letter on the above subject signed "A Tourist," and I must confess that I should have guessed him to be a tourist if he had not said so. In the first place he says that Mr. Stocker, Mr. Lovering, and Capt. David Cock have been very fortunate. Now, I should like to know a few facts. The first two have no doubt done very well, but will "A Tourist" kindly give the names of some of the works belonging to Capt. Cock that have proved so successful so far as the working is concerned, just by way of information for ourselves. When "A Tourist" speaks of the unsuccessful banker I know to whom he refers, but under whose management was the loss incurred at these works, as of course it is one thing to provide the capital, and another thing to spend it, and when there is plenty of capital to be had (belonging to others) it is very surprising what expansive ideas some agent have. With regard to Capt. Minner, he may be a very nice man, and all that "A Tourist" says, but can "A Tourist" favour me with the names of any large works with which he has been connected that have paid well, so that your readers may be enlightened as to his qualifications for the various degrees bestowed upon him. "A Tourist" seems to have had some misgiving as to the quantity and quality of the information given him, as he adds a very

Mr. Rule differs with me again as to its being a packed meeting. I say again it looked very like it, but if he prefers it I will call it a unanimous, compact, family party. Perhaps he will not object to this definition. He well knows the party, the number there, how

It was ultimately resolved that operations should be continued on the silver lode, as recommended by the agent. It was also resolved that, in order to clear off the liabilities of the company, a call of 2s.

The Larches, Westbury on Trym, Bristol; E. D. Brayher, The Larch
bury; G. Ball, 149, Palmerston Buildings, E. R. Blyth, 10, St. Swithun's
Carriat, 16, Blenheim-terrace, Leeds; E. Folme, Linden Gardens, Bay
H. Stone, Graysholt road, Clapham.

AWARDED THE PRIZE MEDALS AT LEEDS, MANCHESTER, AND WREXHAM EXHIBITIONS, 1875 AND 1876.

HADFIELD'S STEEL FOUNDRY COMPANY,

ATTERCLIFFE, SHEFFIELD.

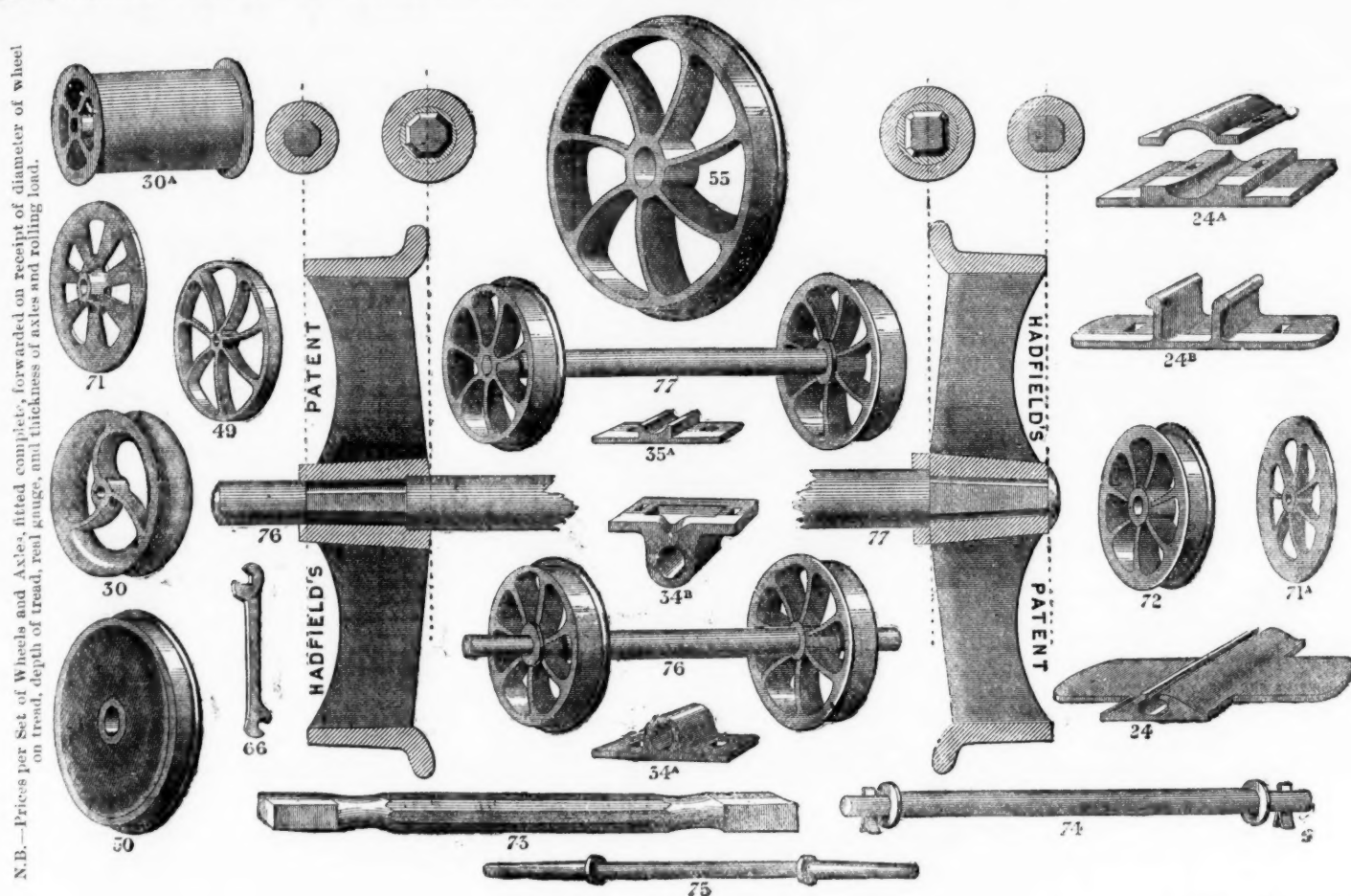
DEVOTE THEIR EXCLUSIVE ATTENTION TO THE MANUFACTURE OF

REFRACIBLE STEEL CASTINGS, for Engineering and Machine Purposes,

AND ARE THE SOLE MAKERS OF

HADFIELD'S CRUCIBLE STEEL WHEELS.

Our departments is specially adapted for the manufacture of these Wheels (as shown below), for Collieries, Ironstone Mines, Slate Quarries, Ironworks, Lead Mines, &c., &c. We have made, and are now making, many HUNDRED THOUSANDS; and having Patented a New Method of Fitting Wheels upon axles, being cheap, effective, and expeditious, we can execute orders presented to us with promptitude, our capacity in this department alone being equal to about 2000 wheels per week.



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HADFELD'S PATENT METHOD OF FITTING WHEELS UPON AXLES.

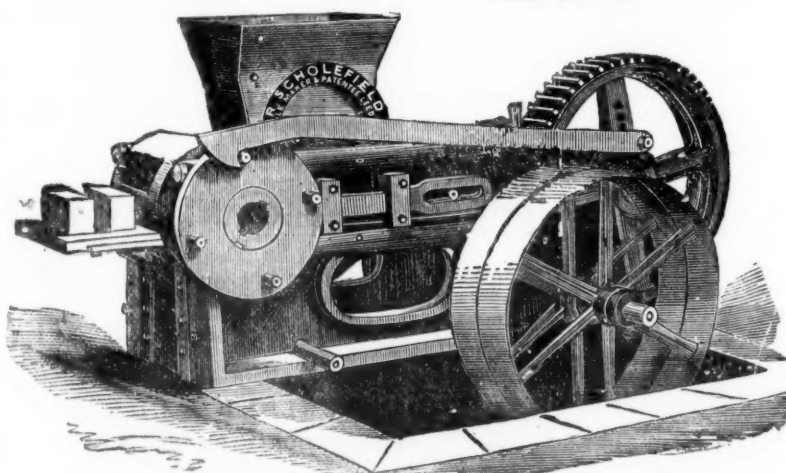
The advantages of the above system are that the Wheels being forced upon a Taper Square-ended Axle, by Machinery, and then riveted (the machine securing truth), it is impossible that they can come loose or get within gauge. They are very cheaply fitted on, and run exceedingly true. We construct the Arms of wheels upon the curved principle (as shown in the drawings above), consequently the shrinkage or cooling of the Castings is not interfered with, thus securing the greatest advantages of our very strong material.

CRUCIBLE CAST-STEEL WHEELS, when cast by us, are made from one-third to one half lighter than Cast-Iron. They cannot be broken while working, even with rough usage, and will wear at least twelve times as long as Cast Iron, thus saving animal and steam power, and reducing wear and tear immensely.

We would also draw special attention to our INCLINE PULLEYS and CAGE GUIDES, the adoption of which will prove highly advantageous.

**R. SCHOLEFIELD'S
LATEST PATENT BRICK-MAKING MACHINE.**

PATENTED 1873.



R. S. begs to call the attention of all Colliery Owners in particular to his **PATENT SEMI-DRY BRICK MACHINE**, and the economical method of making bricks by his patent machinery from the refuse that is taken from the pits during the process of coal-getting, which, instead of storing at the pit's mouth (and making acres of valuable land useless), is at once made into bricks at a very small cost, by R. S.'s **Patent Brick-making Machinery**. If the material is got from the pit hill, the following is about the cost of

production, and the hands required to make 10,000 pressed bricks per day:—

[illegible]

Total cost of making 10,000 pressed bricks £1 5 0, or 2s. 6d. per 1000.

(SETTING AND BURNING SAME PRICE AS HAND-MADE BRICKS.)

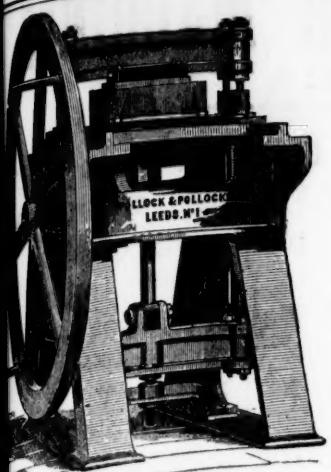
N. B.—Where the material can be used as it comes from the pit, the cost will be reduced in digging.
As the above Machinery is particularly adapted for the using up of shale, bind, &c., it will be to the advantage of all Colliery Owners to adopt the use of the said Brick-making Machinery.

THE MACHINES CAN BE SEEN IN OPERATION AT THE WORKS OF THE SOLE MAKER AND PATENTEE DAILY.

KIRKSTAL ROAD, LEEDS.

RE SOURCE OF POTASH SALTS.—The great commercial importance of the potash industry since the memorable discoveries of Leitch and other mineral salts nearly 20 years ago at Stassfurth and Leopoldshall, is such as to render any further discoveries in this direction of considerable interest to the mercantile and manufacturing community, and also to agriculturists, with whom potash salts are in considerable demand, as a valuable ingredient of compound fertilisers. Previously to the Stassfurth discoveries the sole supply of potash was practically derived from wood-ashes, and its production, owing to its expense, was necessarily limited. For nearly 20 years past the Stassfurth and Leopoldshall deposits have been worked by the Government of Prussia and Anhalt, which have been, until quite recently, an entire monopoly of profits. Lately, however, a company of enterprising explorers, including many gentlemen well known in scientific circles, have, by the aid of the steam rock boring apparatus, succeeded in striking valuable and extensive beds of a similar nature near Aschersleben and beyond Magdeburg, though still in the neighbourhood, of the mines held by the Prussian Government authorities alluded to. A third boring has been completed at a depth of 1486 ft., two previous borings having reached respectively 194 ft. and 1023 ft., and a fourth is in progress. It only has a layer of potash salts of high-class quality been found, and in great thickness, but a pure deposit of rock salt has been encountered to overlie it. Under the German mining laws the German explorers are entitled, in virtue of their discovery, to a whole concession of these subterranean potash fields to the extent of from 5000 to 6000 acres. As the first layer of kainit pierced was 10 ft. thick, and as subsequent measurements indicate in some places a probable thickness of more than 100 ft. of kainit, in addition to a considerable quantity of the mineral carnallite and other salts, soap and practically unlimited store of potash is thus rendered available for many years to come. Among the chief commercial compounds yielded by potash are the carbonate, chlorate, prussiate of potash, bi-chromate, hydrate, nitrate, silicate, and sulphate of potash, and the chloride, bromide, and iodide of potassium. Some of the other of these various products are used either directly or indirectly in the manufactures of soap, glass, saltpetre, alum, dyes, and colours; for cotton printing, washing, spinning, dyeing, tanning, &c.; for numberless metallurgical, preserving, purifying, precipitating purposes; and, lastly, to an enormous extent, both at home and abroad, for manures. Indeed, potash may be said to be utilised in some way or other in most modern industries, and its technical applications bid fair to increase with the cheapness of its supply.

HOWARD'S OINTMENT.—Sores, wounds, ulcerations, and other distressing affections of the skin, are amenable to this cooling and healing unguent. It has the warmest and loudest praise from persons who have suffered for years from bad ulcers, and chronic ulcers, after every hope of cure had long passed away. It is the only one that has experienced the soothing effect of this ointment can form an idea of. It has been bestowed by restraining inflammation and allaying pain. It has been eagerly sought for, as the easiest and safest remedy for all ulcerous affections. In neuralgia, rheumatism, and gout the same application, properly made, gives wonderful relief.



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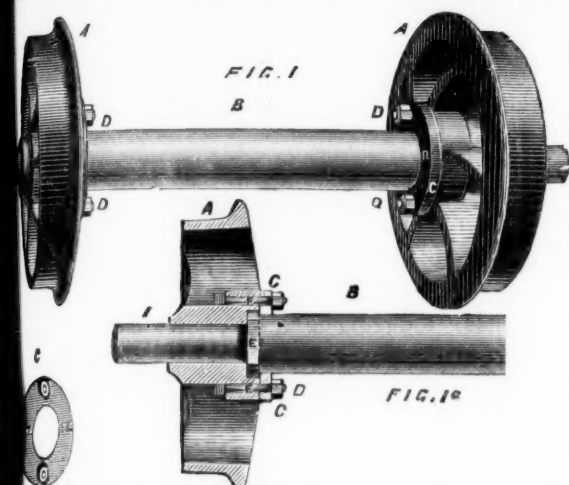
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JOSEPH FENTON & SONS, SYKES WORKS, SHEFFIELD, and 118, Cannon-street, LONDON, E.C., MANUFACTURERS OF CRUCIBLE CAST STEEL CASTINGS,

HAVE PLEASURE IN CALLING THE ATTENTION OF THE MINING WORLD TO THEIR

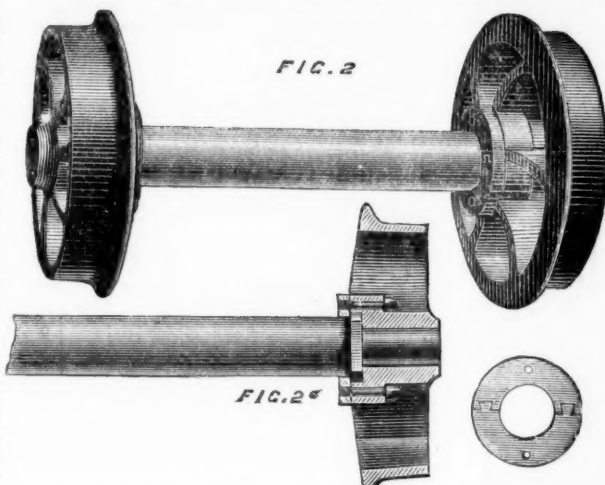
Patent Method of Fitting up Cast Steel Wheels and Axles.



Figs. 1 and 1a show a longitudinal view and plan of a pair of corf wheels and axles fitted up for outside bearings. A A are the wheels; B is the axle; C C, the washers; D D, the bolts; E, the collar on axle B; and F, the recessed boss in the wheel.

The wheel is cast with a recessed boss in the inside, made to any shape, corresponding in shape and depth with a collar formed on the axle. Figs. 2 and 2a show a longitudinal view and plan of a pair of corf wheels fitted up for inside bearings. The washers are secured to the boss of the wheel in outside bearings by bolts and nuts, and in inside bearings by set screws.

The advantages of the above system are:—A, the singular simplicity of fitting—enabling any inexperienced person, with the aid of a spanner or screw-driver, to detach the wheels from the axle or fit them together in a very short time. B, perfect solidity, the wheels and axles becoming as one piece. C, durability, no need of putting the wheels or axles into the fire, under any circumstances, which is so detrimental to wheels, rendering them remarkably brittle, and which under other systems are detached from the axle by the aid of fire. D, economy in fuel and wages, saving hundreds of pounds yearly to large coal owners. The



but deserts secured by this invention of simplicity (so often wanted in patents), solidity, durability, and economy, have not only been amply illustrated by the technical journals interested in the progress of mining operations in this country, but have at once been fully recognised by leading authorities in the mining world.

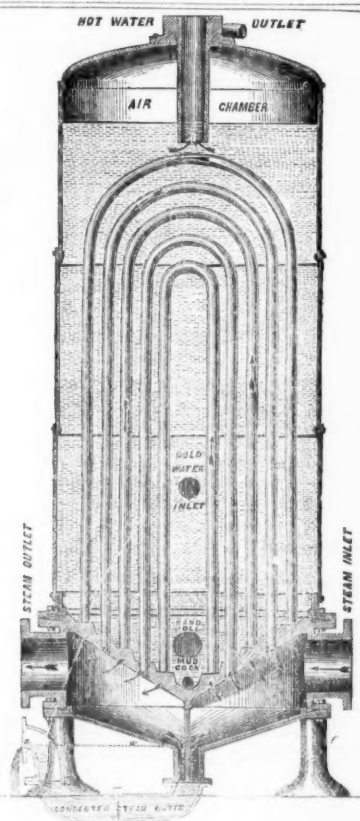
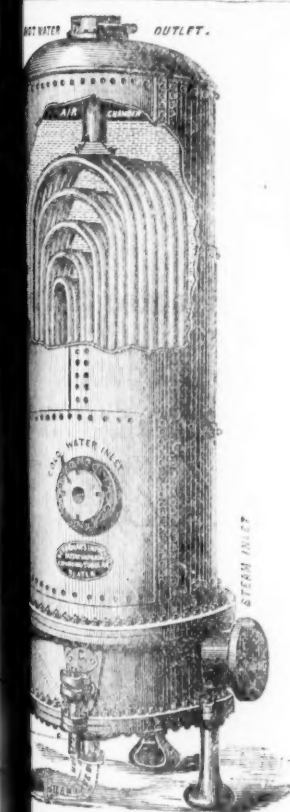
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THE SOLE MAKERS and PATENTEES of these CELEBRATED COAL SAVERS and EXHAUST STEAM UTILISERS, and having remodelled and greatly improved them, adding largely to their capacity and WATER CAPACITY, J. W. and Co. have put down a special plant, which includes an entire new set of improved patterns, enabling them to offer these FEED WATER HEATERS to the public at

GREATLY REDUCED PRICES.

Management of BRASS TUBES of a great length giving an enormous HEATING SURFACE makes this HEATER not only the MOST POWERFUL ever invented, but its FIRST COST PER HEATING SURFACE IS LESS THAN HALF THAT OF ANY OTHER. It will condense the whole of the Exhaust Steam from the Engine if required, and entirely does away with the NOISE of the tubes from exhaust pipes.

THE TUBES ARE OF SPECIALLY PREPARED SOLID DRAWN BRASS AND COPPER; both ends are expanded into the bored holes of the same Tube Plate, METAL TO METAL, and every tube to expand and contract independent of each other. Leakage is impossible, as, when the tubes are once fixed, nothing short of cutting out will remove them. No scurf adheres to the inside of the difference of expansion between SCURF and BRASS. The inside of the Heater can be washed out by means of the mud cock and hand hole whilst at work.

THE WORKS PRESSURE is sufficient no pump or injector is needed.

Water being heated to BOILING POINT UNDER PRESSURE in the Heater, a saving of from 20 per cent. to 25 per cent. in fuel is effected; the disastrous results of grease in boilers are also avoided, and other loose matter in the water being deposited in the Heater, the acids are liberated there instead of in the boiler.

It can be lined with BRASS, COPPER, or LEAD, as may be required in special cases for heating water or any kind of liquor in large quantities for CHEMICAL WORKS, BATHS, WASHING, AQUARIA, GREEN HOUSES, BREWERIES, WOOL WASHING, DYE WORKS, TANNERIES, &c., &c.; they will also HEAT AIR FOR CUPOLAS AND BLAST FURNACES, and are used as INTERHEATERS for compound engines with direct steam from the boiler with a further saving of 15 per cent.

A Price List, with detail information, is now ready, and will be sent on application, together with an Illustrated Catalogue, with references and testimonials from Firms using TWO HUNDRED and THIRTY-THREE of these Heaters.

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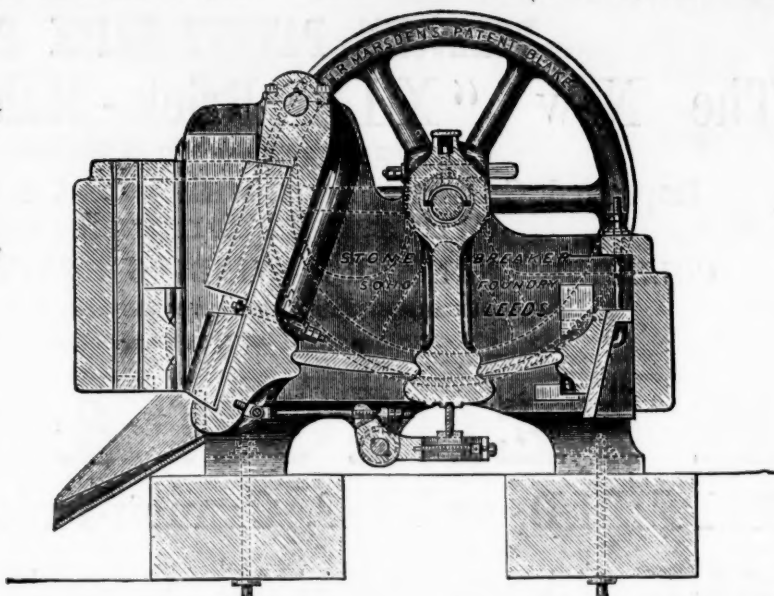
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New Patent Reversible
CRUSHING OR CUBING
JAWS,

WHICH ARE CONSTRUCTED OF A PECULIAR
MIXTURE OF METAL, WEARING.

Four times longer than any
other.

60 GOLD AND
SILVER MEDALS.

OVER 2000 NOW IN
USE.



For Crushing to any degree
of Fineness, or Breaking
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EXCLUSIVELY,
ALSO ALL THE GREAT
Mining Companies of the
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H. R. M. has long observed the want of cheap
machines,
STONE AND ORE CRUSHERS,
And has at length, by means of improved appliances
for the production thereof, been enabled to reduce
the prices, yet keep up at the same time the well
known strength of construction. Reduced price
on application.

FIFTY per Cent., and upwards, saved by using these Machines.

TESTIMONIAL FROM MESSRS. JOHN TAYLOR AND SONS.

DEAR SIR,—We have adopted your Stone Breakers at many of the mines under our management, and are pleased to be able to state that they have in all cases given the greatest satisfaction. We are, yours faithfully,
H. R. Marsden, Esq.

6, Queen-street-place, May 10, 1877.
JOHN TAYLOR AND SONS.

DEAR SIR,—I have broken over 40,000 tons of very hard LIMESTONE into ROAD METAL at the Newport and other Road Trusts, in your PATENT STONE BREAKER, AND ALL WITH ONE PAIR OF JAWS, which are STILL IN USE. I do not think at all, but am quite sure you are the only Machines which fully perform the work you set them out to do, and there are in the Show can at all compare with them. Yours, truly,
H. R. Marsden, Esq.

Royal Agricultural Show, Liverpool, July, 1877.
WILLIAM PRICE, Contractor, Gold Cliff, Monmouth.

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ILLUSTRATED CATALOGUES, TESTIMONIALS, and every information, on application to:—

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Prize Medals, 1851, 1855, 1862, for
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HOPKINSON'S CONVERSATIONS ON MINES, between Father and Son. The additions to the work are near 80 pages of useful information, principally questions and answers, with a view to assist applicants intending to pass an examination as mine managers, together with tables, rules of measurement, and other information on the moving and propelling power of ventilation, a subject which has caused so much controversy.

The following few testimonials, out of hundreds in Mr. Hopkinson's possession, speak to the value of the work:—
"The book cannot fail to be well received by all connected with collieries."—
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"Its contents are really valuable to the miners of this country."—Miners Conference.
"Such a work, well understood by miners, would do more to prevent colliery accidents than an army of inspectors."—Colliery Guardian.

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CHIEF OFFICES—NEWPORT, MON.; and at CARDIFF.

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SUBJECT TO DISCOUNT.

IMPROVED AIR COMPRESSORS.

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BY ROYAL LETTERS PATENT.

This justly-celebrated Rock Drill, the only one invented that will work in the hardest rock without more than the usual repairs required by any ordinary machine, is now offered to the public.

It has been most successfully worked in the well-known Hematite Mines of Lancashire and Cumberland. Will drive 50 ft. in hard rock without change of drill, and can be worked by any miner, and kept in repair by any blacksmith. It is the simplest rock drill ever invented, and cannot with fair usage get out of order.

Plans, Estimates, including Compressors, and all other Mining Machinery, supplied on application to the sole makers,—

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MINING ENGINEERS.

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Crab Winches, Pulley and Snatch Blocks, Screw and Lifting Jacks, Ship Knees, Forgings, and Use Iron of all descriptions.
STOURBRIDGE FIRE BRICKS AND CLAY.